6. $f(x) = \ln(x-1)$ $[2,4]$ $f'(x) = \frac{1}{x-1}$

a) cont on $[2,4]$ yes
diff on $(2,4)$ yes

$$\frac{1}{x-1} = \frac{\ln 3 - \ln 1}{4-2} = \frac{\ln 3}{2} = \frac{1}{2}\ln 3$$

$$\frac{1}{x-1} = \ln\sqrt{3}$$

$$x-1 = \frac{1}{\ln\sqrt{3}}$$

$$x = \frac{1}{\ln\sqrt{3}} + 1$$

Oct 21-11:30 AM

24. local extrema, inc, dec

$g(x) = x^{1/3}(x+8)$ $y'>0$ $y'<0$

$$g'(x) = x^{1/3}\cdot 1 + (x+8)\tfrac{1}{3}x^{-2/3}$$

$$= \left(\sqrt[3]{x} + \frac{x+8}{3\sqrt[3]{x^2}} = 0\right)3\sqrt[3]{x^2}$$

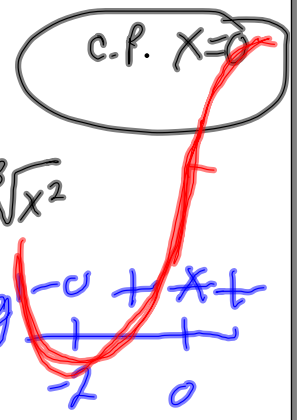
$$3\sqrt[3]{x^3} + x + 8 = 0$$

$$3x + x + 8 = 0$$

$$4x + 8 = 0$$

C.P. $x = -2$

C.P. $x = 0$



sign graph

Oct 21-11:47 AM

4.3 relation between f, f', f''

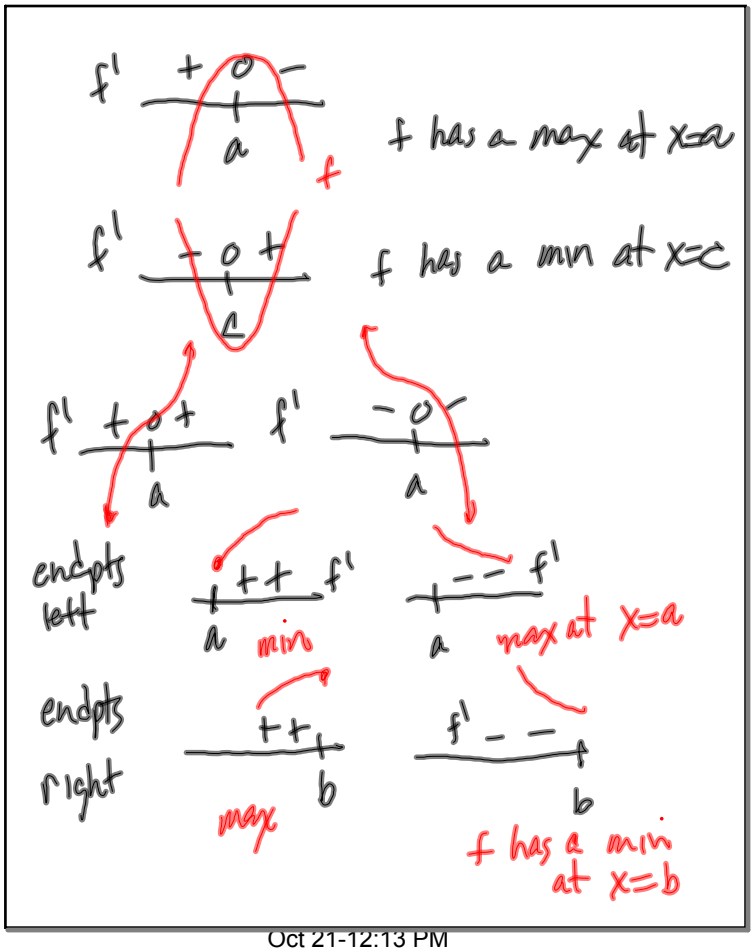
if $f' > 0$, f is increasing

$f' < 0$, f is decreasing

$f' = 0$, f is flat (for an instant)

f' $\not\exists$ pointy, or f is undef., gap

Oct 21-12:03 PM



Oct 21-12:13 PM

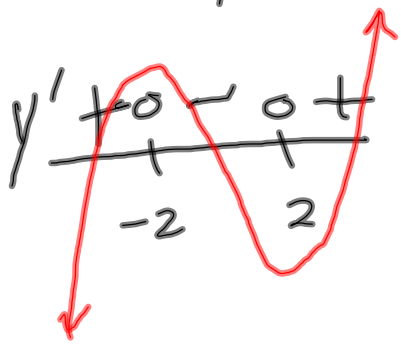
$y = x^3 - 12x - 5$ find extrema, inc, dec

$y' = 3x^2 - 12 = 0$

$3(x^2 - 4) = 0$

$3(x-2)(x+2) = 0$

$x = \pm 2$



max is $(-2)^3 - 12(-2) - 5 = 11$

min is $2^3 - 12(2) - 5 = -21$

inc on $(-\infty, -2) \cup (2, \infty)$

dec on $(-2, 2)$

Oct 21-12:19 PM

y'' ? $y'' > 0$, y concave up

$y'' < 0$, y concave down

f'' changes sign, f changes concavity

inflection point

Oct 21-12:28 PM

Ex 3 $y = e^{-x^2}$ find infl. pts

$y' = -2x \cdot e^{-x^2}$

$y'' = (-2x)(-2xe^{-x^2}) + e^{-x^2}\cdot(-2)$

$= 2e^{-x^2}(2x^2 - 1) = 0$

always pos

$2x^2 - 1 = 0$

$x^2 = \frac{1}{2}$

$x = \pm\sqrt{\frac{1}{2}}$

y'' + 0 − 0 +

$-\sqrt{\frac{1}{2}}$ $\sqrt{\frac{1}{2}}$

Oct 21-12:34 PM